

Claims

1. A stamping film, such as a hot stamping film or a laminating film, for producing tamper-proof motor vehicle license plates, comprising a carrier film (12) and a transfer layer (14) which is detachable therefrom and which can be fixed on a substrate (32) of the motor vehicle license plate,

characterized in that

the transfer layer – starting from the carrier film – has a transparent release layer (16), an opaque decoration layer (18), a transparent protection layer (20), an optically variable layer (22), a reflection layer (24) and an adhesive layer (30), wherein the decoration layer (18) has mutually spaced areal interruptions (36) at which the transparent protection layer (20) adjoins the release layer (16) and wherein the adhesive layer (30) is provided for fixing the transfer layer (14) to the substrate (32) of the motor vehicle license plate.

2. A stamping film as set forth in claim 1 characterized in that the areal interruptions (36) of the decoration layer (18) have a peripheral edge of a graphic configuration.

3. A stamping film as set forth in claim 1 or claim 2 characterized in that the areal interruptions (36) of the decoration layer (18) are of small area dimensions which preferably occupy a proportion of surface area of less than 20%.

4. A stamping film as set forth in claim 1 characterized in that a colored layer (28) is arranged between the reflection layer (24) and the adhesive layer (30).

5. A stamping film as set forth in claim 4 characterized in that a bonding layer (26) is provided between the reflection layer (24) and the colored layer (28).

6. A stamping film as set forth in claim 1 characterized in that the optically variable layer (22) is a replication layer with a diffractive relief structure.

7. A stamping film as set forth in claim 6 characterized in that the diffractive relief structure forms a hologram.

8. A stamping film as set forth in claim 6 characterized in that the diffractive relief structure is a relief structure which diffracts the incident light directed in one or more directions from specular reflection.

9. A stamping film as set forth in claim 1 characterized in that the optically variable layer (22) has a macrostructure, preferably an asymmetrical macrostructure, the dimensions of which are ≥ 0.4 mm and the extreme value spacing of which is ≥ 0.1 mm.

10. A stamping film as set forth in claim 1 characterized in that the optically variable layer (22) has a matt structure, preferably an anisotropic matt structure.

11. A stamping film as set forth in claim 1 characterized in that the optically variable layer (22) has a nanotext.

12. A stamping film as set forth in claim 1 characterized in that the optically variable layer (22) has a pattern with first and second partial surfaces, wherein the first partial surfaces form background surfaces in the pattern and the second partial surfaces form pattern elements in the pattern, wherein the first partial surfaces have mirror surfaces reflecting the incident light or relief structures for directedly diffracting the incident light and the second partial surfaces have relief structures of a predetermined optically effective structural depth which are adapted as absorber surfaces for the incident light so that in a given direction the light which is diffracted or reflected at the first partial surfaces is present as a background surface in relation to dark, light-absorbing pattern elements, and in other directions the intensities per unit of surface area of the light scattered in the background surfaces and in the pattern elements are equal

so that the contrast between the background surfaces and the pattern elements is markedly reduced or extinguished.

13. A stamping film as set forth in claim 12 characterized in that the first partial surfaces are flat mirror surfaces so that the pattern in the reflected light has the intensively light mirror surfaces of the background surfaces and the dark, light-absorbing pattern elements and in directions other than that of the reflected light the intensities per unit of surface area of the light scattered in the background surfaces and in the pattern elements are equal so that there is no contrast between the background surfaces and the pattern elements.

14. A stamping film as set forth in claim 13 characterized in that the first partial surfaces are mirror surfaces which are inclined in one or more directions with respect to the plane defined by the stamping film so that in the direction of the light reflected at the plane the intensities of the light scattered in the background surfaces and of the light scattered in the pattern elements are equal so that there is no contrast between the background surfaces and the pattern elements and in one or more other directions there are the intensive light mirror surfaces of the background surfaces and the dark, light absorbing pattern elements.

15. A stamping film as set forth in one of claims 12 through 14 characterized in that the relief structures of the second partial surfaces are a cross-grating composed of two base gratings arranged in substantially mutually right-angled relationship, wherein the periods of the base gratings are shorter than a predetermined limit wavelength of the visible light.

16. A stamping film as set forth in one of claims 12 through 15 characterized in that the effective structural depth of the relief structure of the second partial surfaces is of a value of between 50 nm and 500 nm.

17. A stamping film as set forth in claim 16 characterized in that the pattern has regions with various gray stages which differ by the optically effective structural depth.

18. A stamping film as set forth in claim 1 characterized in that the optically variable layer (22) is a thin-film element for producing a color change by interference.

19. A stamping film as set forth in claim 18 characterized in that the optically variable layer (22) has an absorption layer and a spacer layer.

20. A stamping film as set forth in claim 18 characterized in that the thin-film element has a number of thin layers with different refractive indexes.

21. A stamping film as set forth in claim 1 characterized in that the optically variable layer (22) has at least one polarization layer.

22. A stamping film as set forth in claim 1 characterized in that the reflection layer (24) is a metal thin layer.

23. A stamping film as set forth in claim 1 characterized in that the reflection layer (24) is formed by at least one dielectric layer comprising an inorganic dielectric.

24. A stamping film as set forth in claim 1 characterized in that the release layer (16) and/or the decoration layer (18) and/or the protection layer (20) and/or the colored layer (28) contains UV absorber and/or HALS stabilizer additives for improving UV resistance.

25. A stamping film as set forth in claim 1 or claim 4 characterized in that the decoration layer (18) and/or the colored layer (28) contains amorphous carbon.

26. A tamper-proof motor vehicle license plate comprising a substrate (32) on which a transfer layer (14) of a stamping film (10) is fixed,

characterized in that

the transfer layer has a transparent release layer (16), an opaque decoration layer (18), a transparent protection layer (20), an optically

variable layer (22), a reflection layer (24) and an adhesive layer (30), wherein the decoration layer (18) has mutually spaced areal interruptions (36) at which the transparent protection layer (20) adjoins the release layer (16) and wherein the adhesive layer (30) is provided for fixing the transfer layer (14) to the substrate (32) of the motor vehicle license plate.

27. A tamper-proof motor vehicle license plate as set forth in claim 26 characterized in that the areal interruptions (36) of the decoration layer (18) have a peripheral edge of a graphic configuration.

28. A tamper-proof motor vehicle license plate as set forth in claim 27 characterized in that the areal interruptions (36) of the decoration layer (18) are of small area dimensions which preferably occupy a proportion of surface area of less than 20%.

29. A tamper-proof motor vehicle license plate as set forth in claim 26 characterized in that a colored layer (28) is arranged between the reflection layer (24) and the adhesive layer (30).

30. A tamper-proof motor vehicle license plate as set forth in claim 26 characterized in that the release layer (16) and/or the decoration layer (18) and/or the protection layer (20) and/or the colored layer (28) contains UV absorber and/or HALS stabilizer additives for improving UV resistance.

31. A tamper-proof motor vehicle license plate as set forth in claim 26 or claim 28 characterized in that the decoration layer (18) and/or the colored layer (28) contains amorphous carbon.